

PATENT APPLN. NO. 10/551,031
RESPONSE UNDER 37 C.F.R. §1.111

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REMARKS

Claim Rejections - 35 USC § 103

Claims 1-5, 8-10 and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneko, JP 2002-226675, in view of Matsumura et al., JP 2001-294445 ("Matsumura").

Applicants respectfully submit that a person of ordinary skill in the art would not have been motivated or would not have otherwise had a proper reason to modify the composition of Kaneko as proposed in the Action and that, as explained below, the proposed modification would not have resulted in embodiments of the invention as recited in at least certain of the rejected claims.

(1) Regarding claims 1-5

The paste composition of the present invention as recited in claims 1-5 is characterized in that it contains 25 wt% or less, based on the total amount of the paste composition, of one or more solvents having a boiling point of 160°C or higher. The combination of Kaneko and Matsumura, however, does not lead a person of ordinary skill in the art to the specific selection of a solvent having a boiling point is 160°C or higher in an amount of 25 wt% or less based on the total amount of the paste composition and does not enable a person of ordinary skill in the art to predict the results of such selection on the properties of a

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dielectric composition prepared from the paste.

In the present invention, it is important that the paste composition contain a solvent having a boiling point of 160 °C or higher. If the boiling point of a solvent is 160 °C or higher, generating of voids is suppressed and the relative dielectric constant of the dielectric composition prepared from the paste composition can be made high. If the boiling point is lower than 160 °C, since the speed of volatilization of the solvent is fast, densification by the migration of components cannot follow the speed of volatilization, the void portion increases, and the relative dielectric constant of the dielectric composition is likely to decrease (see page 9 of the specification of the present application).

Kaneko discloses butyl carbitol acetate (boiling point: 246.7 °C) and gamma-butyl lactone (boiling point: 205 °C) as possible solvents. However, Kaneko also discloses solvents having a boiling point of lower than 160 °C, such as dimethylformamide (boiling point of 153 °C). Kaneko disclose nothing which would lead the person of ordinary skill in the art to the specific choice of a solvent having a boiling point of 160 °C or higher.

In addition, the solvent in Kaneko is used only for the purpose of viscosity control (par [0015]), and is not required in

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the paste. Kaneko does not disclose, and it cannot be fairly predicted, how the boiling point of a solvent will affect generating of voids and the relative dielectric constant of the dielectric composition.

It is also important in the paste composition of the present invention that the total content of the solvent be 25 wt% or less based on the total amount of the paste composition. When the content of the solvent is 25 wt% or less, generating of voids during drying due to solvent removal is suppressed, and the relative dielectric constant of the dielectric composition can be made high. Furthermore, since the amount of voids which can cause moisture uptake is small, a change of material properties under the effect of moisture and water can be decreased. Furthermore, preservation durability is excellent. If the content of the solvents is more than 25 wt%, voids increase in drying and heat-curing processes for removing the solvent, and the relative dielectric constant of the dielectric composition is likely to decrease (see page 9 of the specification of the present application).

Although the content of solvent in the example in Matsumura is 21%, Matsumura does not disclose how the content of solvent affects the degree of voids generated in drying and heat-curing processes.

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Additionally, the paste of Matsumura is heated, for example, at 850 °C (par. [0032]) after being coated on a substrate (par. [0024]). In the heating process, organic components are decomposed and vaporized and inorganic fillers/powders in the paste are sintered. The content of voids in the paste can change during the sintering process. Therefore, the content of solvent cannot control the content of voids.

For the above reasons, a person having ordinary skill in the art would NOT have found it obvious to modify the paste composition of Kaneko according to the teachings of Matsumura to obtain the paste composition as specifically defined in the rejected claims with the necessary expectation of successful results.

Notwithstanding that the combination of Kaneko and Matsumura does not properly support the obviousness of the paste composition defined in claims 1-5 of the application, criticalness of the boiling point of the solvent and the amount of solvent sufficient to rebut the Office's case of obviousness is demonstrated by the comparative data in the application. (Refer to Tables 1 to 4 in the application).

(2) Regarding claims 9, 10, 17

Claim 9 defines a dielectric composition obtainable by removing solvent from and solidifying the paste composition

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described in claim 1, wherein the content of the inorganic filler is 85 to 99 wt% based on the total amount of the solid component contained in the dielectric composition, and a porosity is less than 30 volume %.

Matsumura discloses that the paste disclosed therein is calcined (at 500 to 1000 °C) and organic substances are decomposed and evaporated (par. [0024]). In the examples of Matsumura, the paste is held at 850 °C for 10 minutes for calcination (par. [0032]). Therefore, after the paste in example 1 is dried and solidified, all organic substrates, namely: d) polymer, f) stabilizer (1,2,3-benzotriazole), g) dispersant ("Nopcosperse" 092), and h) leveling agent ("Disparon" L1980), are calcined and the residue consists of a) glass powder and b) magnetic substance powder. This means that the content of the inorganic filler is 100 wt% based on the total amount of the solid component.

For the above reason, the proposed modification of the composition of Kaneko according to the teachings of Matsumura will not result in the dielectric composition of claims 9 and 10 nor the capacitor of claim 17.

Claim 18 is rejected in the Action under 35 U.S.C. § 103(a) as being unpatentable over Kaneko in view of Matsumura and in further view of Ingman et al., U.S. Patent Publication No. 2003/0026584

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("Ingman").

Claim 18 defines an optical wiring comprising an optical wiring layer obtained by removing the solvent from the paste composition of claim 1.

Ingman discloses a resin foam having a porous structure (paragraph [0070]). The paste composition of the present invention suppresses void generation as explained above. An optical wiring having a porous structure does not suggest the optical wiring recited in claim 18.

Moreover, the rejection of claim 18 depends on the sufficiency of the combination of Kaneko and Matsumura to support obviousness under 35 U.S.C. § 103(a) of the paste composition of claim 1. As explained above, the combination of Kaneko and Matsumura does not support a prima facie case of obviousness under 35 U.S.C. § 103(a) of the paste composition defined in claim 1. Therefore, claim 18, which requires the paste composition of claim 1 as a starting material, is prima facie patentable.

Claims 11-13, 15, 16 and 19 are also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneko in view of Matsumura.

Regarding these claims, one of the purposes of the present invention is to obtain a high relative dielectric constant of a dielectric composition by mixing an inorganic filler having a

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bigger mean particle diameter with an inorganic filler having a smaller mean particle diameter. Generally, as the content of an inorganic filler which has a high dielectric constant increases, the relative dielectric constant of the dielectric composition obtained increases. In order to make a resin containing an inorganic filler with a high filling factor in the present invention, it is preferable to mix and use two or more kinds of filler of different mean particle diameters, since if one filler is smaller than the size of voids generated between larger fillers, it can easily enter into these clearances and the filling factor can be easily increased (see page 12 of the specification of the present application).

Neither Kaneko nor Matsumura discloses recognizes such a concept. The mean particle diameters of glass powder and inorganic powder of Matsumura are decided in view of low printed-surface smoothness (paragraphs [0011] and [0014]). Therefore, Matsumura does not disclose and does not suggest that the greatest mean particle diameter should be 0.1-5 μm and 3 times or more than the minimum mean particle diameter in a dielectric composition, and does not disclose or suggest that such dielectric composition will have a higher relative dielectric constant.

Therefore, a person having ordinary skill in the art would NOT

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have found it obvious to modify the particle sizes of the particles of inorganic filler of Kaneko and could not have fairly predicted that such modification would result in a high relative dielectric constant of the dielectric composition.

For the above reasons, the combination of prior art references in the 35 U.S.C. § 103(a) rejections do not support the obviousness of the rejected claims under 35 U.S.C. § 103(a). Withdrawal of the rejections and a notice of allowability are respectfully requested.

The foregoing is believed to be a complete and proper response to the Office Action dated July 6, 2009.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,
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